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ABSTRACT

This paper examines the importance of hands for the person who is deafblind, reviews hand development, and identifies specific teaching skills that facilitate hand development and expressiveness in persons who are deafblind. It notes that the hands of a deafblind individual serve not only as tools but also as sense organs (to compensate for their missing vision and hearing) and as the primary means of expression. The literature is reviewed on the role of hands in early development in general, hand development in the child who is blind, hand development in the child who is deaf, and hand development in the child who is deafblind. Among 13 suggested teaching strategies are: (1) watch and/or touch the individual's hands and learn to read them; (2) use the teacher's hand under the child's hand to respond to exploration, to initiate topics, and to express feeling; (3) make your hands available for the child to use as he/she wishes; (4) play interactive hand games frequently; (5) make environmental provisions to encourage hand activity; (6) invite the child who is deafblind to have frequent tactual access to the environment; (7) make language accessible to the hands of the person who is deafblind; and (8) become aware of your own hands as carriers of feelings and pragmatic functions. An "afterward" by Harlan Lane suggests that people with deafblindness can teach others how to channel information through the tactile sense. (DB)

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ED 419 331

DB-LINK Fact Sheet

The National Information Clearinghouse On Children Who Are Deaf-Blind

Talking the Language of the Hands to the Hands

By Barbara Miles

Afterward by Harlan Lane

Illustrations by Rebecca Marsh

The Importance of Hands for the Person Who is Deafblind

A person who cannot see or hear—or who lacks significant amounts of these senses—must be given a way to compensate for the missing information these senses usually provide. In the words of Harlan Lane he must be given "modality-appropriate stimulation" (1997). Most commonly it is the hands that take over the function of the eyes and ears for the person who is deafblind. Fortunately, as both Harlan Lane and Oliver Sacks have reminded us, the brain is extremely plastic. When a sense is used a great deal, the brain is able to process information from that sense more efficiently. People who use their fingers extensively, such as Braille readers and string players, "give evidence of increased cortical representation of the fingers." (Lane, 1997). What is more, areas of the brain previously devoted to visual or auditory processing can be reallocated to processing tactile information, providing the hands with even more brain power. In this way, the hands of a person who is deafblind can become, in addition to their usual role as tools, useful and intelligent sense organs, allowing people without sight and hearing to have access to objects, people, and language that would otherwise be inaccessible to them. It is important to note here that the brain is most plastic, most adaptable, when a child is young, and therefore, the earlier a child who is deafblind can learn to use his hands as finely tuned receptors, the more likely he will be to make optimum use of his hands to get information.

Often the hands of a person who is deafblind must assume an additional role. Not only must they be tools (as they are for all people who have use of their hands), and sense organs (to compensate for their missing vision and hearing), but they must also become voice, or the primary means of expression. Sign language and gesture will often become the main avenue for expressive communication. For these tasks, the hands must be skilled in a unique way, able to express such things as tone, nuance of feeling, and emphasis of meaning in addition to being able to form words.

Because the hands of a person who is deafblind are so important—functioning as tools, sense organs, and voice—it is crucial for educators, parents, and friends of people who are deafblind to become especially sensitive to hands. They must learn how to read the hands of the person who is deafblind and how to interact with them, in order to ensure their best development. They must learn how to present information so that it is accessible to the hands, since this is often the only remaining modality. They must "speak the language of the hands to the hands" and "read the language of the hands from the hands."

In order to do these things well, it is important to understand what role the hands play in typical development, and in the development of children who are blind and children who are deaf. This understanding will help educators, parents, and friends interact as skillfully as possible to facilitate the

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development of the hands of the person who is deafblind.

The Role of Hands in Early Development

For all of us—deafblind or not—the development of our hand skills as infants paralleled the development of our emerging sense of self in the world. Thanks to our growing abilities to use our hands as tools, we became confident in our power to act on objects and persons, to explore, to move about in the world. Perhaps no one has documented this development as carefully as Selma Fraiberg in her 1997 book, Insights from the Blind. Much of what she and her colleagues learned about normal development they came to understand by first observing carefully the development of a few children who were blind. Their observations of these children caused them to reflect upon how all children use their hands and how hands contribute to the growth of the individual.

The hands of the newborn infant are not yet tools. They are usually held at shoulder height on either side of the body and execute random instinctive movements. They are also subject to the tonic neck reflex, where the extension of a hand and the turning of the head toward the hand occur together. This reflex predisposes the baby to look at his own hand (Fraiberg, p. 150). After the tonic neck reflex disappears, the midline orientation of the head and the random bringing together of the hands at midline results in further visual and tactile rewards as the fingers experiment with touching, moving, and grasping. Once the infant begins to connect the visual experience of the movement of the hands and arms with the corresponding proprioceptive muscular experience, there is the possibility of increasing control of the hand movements. Reaching, grasping, dropping, throwing—the infant executes all of these again and again, all the while experiencing herself more and more surely as a being who is able to act upon the world.

In the second half of the first year, the achievement of hand-eye coordination and the ability to reach and grasp provide the decisive motivation for mobility. The infant sees an object or person and moves toward it in an effort to grasp. The hands and the eyes pull the child outward into the world beyond her own body. Crawling and walking bring their own rewards as the infant gains more ideas about the world and more confidence in her ability to explore it and affect it.

Hands also play a crucial role in language development. In all children, hands are an important form of expression. Nearly everyone has seen a proud parent showing off their infant child who just learned to wave "bye-bye" or blow a kiss. Gestures such as these often precede the first spoken words. Perhaps the most important gesture in language development is the pointing gesture. A mother pointing at an object as she names it ("Look! Doggie!") is establishing a mutual topic and ensuring that she and her child are focused on the same thing. The word that names the thing can then acquire meaning for the child. A young child who is just learning her first words will use the point and the accompanying glance toward mother or other adult over and over again as a way of confirming her new skill of naming. This pointing gesture grows out of the reach, which in turn grows out of the confident coordination of hand and eye. In all children, these developing hand skills lay the foundation for the acquisition of language.

Hand Development in the Child who is Blind

The situation is obviously different for the infant who cannot see. In the first place, the tonic neck reflex and the bringing together of the hands at midline do not bring visual rewards. Perhaps for this reason, it generally takes much longer for the hands to come under conscious control and to act as agents of desire and will, independent of instinctual, reflexive movements.

In fact, without sight, it is a huge task for a child to learn to use her hands as tools and as differentiated organs of perception. Selma Fraiberg noticed in her observations—first, of one young boy named Peter and then, of many other preschool children who were blind—that the hands of these children often remained for a long time in the typical young infant position, at shoulder height, seemingly unaware of their own power. Many children who are blind are slow in bringing their hands together at midline, and also slow in developing intentional prehension, that is, reaching and grasping.

Fraiberg also noticed that Peter's hands and the hands of other young children who were blind behaved for a very long time like mouths. They clawed, "bit," and pinched, much like teeth. Their hands seemed to be making the same kind of effort that the mouth makes to take things into itself, to incorporate. Their hands were tools, but crude ones; and they required much practice and development before they found "pleasure in manual exploration of objects" (p. 33). In order for his hands to become sense organs in their own right, to be interested in exploring the world, separate from his mouth, Peter seemed to need to go through a stage of using them to throw things in a more and more focused way. Selma Fraiberg speculates that this throwing was part of a "process of separating the skeletal muscles from the mouth" (p. 47). She notes that sighted children (most of whom go through a similar but shorter throwing stage) are also typically beginning to learn to move independently at this stage, thus affording them the opportunity to use their skeletal muscles and to experience their own physical aggressiveness and competence in positive ways. The child who is blind and who has not learned even the beginnings of locomotion (because he is not yet lured by objects "out there") may be in Peter's position of not yet having a large-muscle outlet for his aggression. He may, therefore, use his hands in conjunction with his mouth as outlets for this energy. Fraiberg found that when Peter was allowed and encouraged to throw safely, he did so in an increasingly focused way, and his aggression toward people— manifest in his pinching and clawing—subsided rapidly.

Blindness imposes yet another monumental task on the hands of the child who is born with this limitation. Without the help of sight, the child must learn to confer object permanence upon the world around her. She must come to know for certain that objects exist apart from her immediate experience of them. The hands and ears are her only reliable means of doing this. In a normally developing infant who can see and hear, this is accomplished through the coordination of all the senses. An object that is seen, touched, and possibly heard and smelled, can be followed with the eyes as it disappears, can be heard when it is out of sight, and can be located with the eyes when it is heard. These experiences build upon one another until the infant (usually by about 9 months) is confident of the existence of objects and people apart from herself, and will search for a lost object. Along with the achievement of object permanence comes a big step in the development of self-concept: The child learns to feel that "I exist," apart from others and apart from the object world.

A child who is blind normally achieves object permanence later than the child who can see. He ever so gradually learns that the sound of a favorite toy indicates the existence of that toy in space. Just as gradually, he learns to reach for that object. This assurance lays the foundation for mobility, as it lures the child outward. Fraiberg has documented the minute stages in the development of this sense of object permanence in her description of a young boy whom she calls Robbie. In the culmination of this process, at age 10 months and 10 days, Robbie was first observed to finger an object in an exploratory manner (rather than simply banging on the object, or grasping it and banging it, or dropping it, or throwing it). His fingering seemed to indicate that he finally had the idea that "it is a thing which has qualities of its own, independent of his own activity" (p. 192). About three weeks later, Robbie reached for an object on sound cue alone for the first time, and three days after that, he crept for the first time. What led up to this important breakthrough for this young boy were weeks and months of experimentation and play in which he was learning that the information from his hands and from his ears could be coordinated. He was learning to trust, too, that his hands and ears could indeed give him reliable information about the world.

The part that hands play in the language development of the child who cannot see is important. One of Fraiberg's most important discoveries was that the hands of the child who is blind are very expressive, and they often take over the functions that smiling, eye gaze, and facial expressions perform for the sighted child. They move excitedly in response to pleasure and interest, even before they find themselves able to explore or intentionally reach out. Fraiberg found that if she could educate mothers and caregivers to notice the hands of their children who could not see, they could read a great deal there. Mothers who failed to do that often experienced a breakdown in their relationships with their infants, probably because the mutual eye-gaze and reciprocal smiles that usually lay the foundation for such relationships were impossible with a child who was blind. Fraiberg found that teaching mothers to see smiles and signs of interest in the hands of their children helped them to maintain positive turn-taking interactions and reinforce the early bonding necessary for healthy development.

Pointing and gesturing will obviously not have the same meaning for a child who is blind as they do for a child who can see. As a result, the first words of children who cannot see are often words that name things that make distinctive sounds or things that are often within the hands' reach of the child. Hearing the name of a thing spoken as he is touching it, or as he hears its sound, helps the child make the link between the name and the thing. Mutual touch is the most direct equivalent of the pointing gesture for a child who is blind since it lets him know most surely that there is a mutual referent, that the object named is the mutual topic that he shares with the one speaking (the precise nature of this touch is important and will be discussed later). Selma Fraiberg observed the relationship of touch and language development when she noticed that, as Peter "discovered objects, handled them, discriminated and named them, his vocabulary enlarged very quickly" (p. 43).

Hand Development in the Child who is Deaf

The hands of a child who is deaf follow a normal sequence of development—learning to coordinate with information from the eyes, learning to reach and grasp, and becoming more confident agents of the self. They also usually assume the added task of becoming voice for the child in a far more extensive way than they do for children who can hear and speak. Recent linguistic research has noted that children who are deaf "babble" with their hands, making random and increasingly differentiated handshapes that will later be useful in forming the signs of American Sign Language (or whatever language turns out to be the child's native sign). Children who are deaf and exposed to sign language from birth do this sort of babbling at about the same age as hearing children babble with their voices. They begin forming signs ("speaking" their first words) at about the same time as children who use their voices to make their first words (Quigley & Paul, 1984, p. 95). It seems that when the hands of a child who is deaf are encouraged to be the main avenue of expression, they frequently assume the role with competence and at typical ages.

Hand Development in the Child who is Deafblind

Given the tasks of achieving early bonding, object permanence, hand autonomy, and mobility for the child who is blind, one can only imagine the compounded difficulty for the child who can neither see nor hear. In addition, the hands of a child who is deafblind must also become voice, as they must for most children who are deaf. Fortunately, children who are deafblind often have some residual vision and/or hearing which they can use to help make the connections necessary to proceed through these developmental milestones that involve hand use. Skillful education of remaining vision and/or hearing is absolutely crucial in helping the child who is deafblind achieve bonding, object permanence, hand autonomy, and hand expressiveness—all of which are prerequisites to the fundamental achievements of a strong sense of self, independent mobility, and language development.

In the cases in which neither vision nor hearing can be relied upon, the hands must largely assume the tasks of achieving exploratory competence, helping to gain a secure sense of object permanence and thereby a motivation for mobility, helping to construct a body image and sense of self in the world, and gaining the ability to express feelings and ideas in differentiated ways. The hands of the child who is deafblind must become curious, must learn to search, explore, reach and grasp, and must become able to express an increasingly wide range of feelings and ideas—all without the reinforcement that vision and hearing provide. It is absolutely crucial that this development happen, because for such a child, hands are the primary connection to the world. Without education of the hands (or without compensatory use of other avenues of information, in the cases where the use of hands is impossible), there will be no differentiation of self and world, no acquisition of language, and no cognitive development beyond the most elementary ideas.

My observations of developmentally young children who are deafblind lead me to believe that their hand development is intimately related to their conversational interactions with primary caregivers. In numerous cases I have observed that an infant's or young child's first exploratory hand behavior is a kind of self-stimulation, often hand in mouth, or hands on other parts of the body. The child's first reaching out into the world beyond his own body occurs from within the safety of secure physical support, and the first object of exploration other than his own body is most often the body of a caregiver.

Exploring the face of mother or another person, when such exploration is encouraged and reinforced, happens again and again, and eventually develops into further exploration of the world. When this exploration is not encouraged, the child's hands do not learn to reach out for information. They remain fixated on his own body.

The crucial question is just how to encourage tactile exploration and how to help extend it out into the world. How does one educate the hands of the infant or young child? And how does one continue to educate the hands of the older child who is deafblind? What precise kinds of touching encourage the child to reach out more and more surely into the world and to use her hands as primary avenues of expression?

Teaching Skills that Facilitate Hand Development and Expressiveness in Persons who are Deafblind

I will speak here as though I were talking about individuals who are totally blind. But most of these suggestions can be applied fruitfully to children and adults with low vision and impaired hearing, who often need the support of the basic sense of touch to strengthen concepts about the world, especially during early stages of development.

1. Watch and/or touch the child's or adult's hands and learn to read them.

This follows Selma Fraiberg's advice to the mothers of children who are blind. It is harder to do this than it might seem. People who can see are accustomed to looking at other people's faces for evidence of feeling and attention. Learning to notice the hands of the persons who are deafblind is a skill that must be practiced. Often we can also learn to use our own hands as sense organs, as well as using our eyes, in order to find out more about what the hands of the person who is deafblind are expressing. Keeping in touch with the child's or adult's hands will help us read them. Fraiberg noted that if we shift our attention from the face of the blind baby to his hands, we can read an eloquent sign language of seeking, wooing, preference, and recognition which becomes increasingly differentiated during the first six months (p. 107).

2. Think of hands as initiators of topics in conversational interactions, particularly with young children who do not yet use words.

A child who can see but who is nonverbal usually initiates topics with adults through a combination of babbling, eye gaze, and gesture (point, reach, push away). Eye gaze is an especially powerful initiator of topics between child and mother or caregiver. This avenue is not available for the child who can neither see nor hear. Those who wish to engage in meaningful interactions with a child who is deafblind and nonverbal must learn to look elsewhere to find what the child is paying attention to—what she is interested in—so that interactions with the child can be about topics that are engaging for her. Hands are a frequent initiator of topics for the child who is deafblind. They often indicate what the child is attending to at the moment.

Anything the child is doing or touching with her hands can be thought of as a potential topic of interaction. The earliest topics of interest will usually involve the child's own body and the bodies of those who are physically close. A young child who is deafblind is first interested in what his own body can do and what the bodies of others can do and what they feel like. At the very earliest stages, attention is not yet centered in the hands, but seems to reside in the whole body, as evidenced by the delight in whole-body movement seen in very young and developmentally young children. Encouraging the child to become interested in what his hands happen to be touching is part of helping him grow developmentally. He will benefit if he can move his attention gradually from whole-body attention to attention that is more hand-centered, because his hands can act upon the world in ways that his whole body cannot. Encouragement for this development can happen best with touch that is both nondirective and responsive.

3. Use hand-under-hand touch to respond to exploration, initiation of topics and expressions of

feeling.

A child who is deafblind and often apparently quite helpless tends to elicit helping behaviors from caregivers. One of the most prevalent kinds of help that people give is "hand-over-hand" manipulation (the teacher's or parent's hands over the hands of the child). Done too routinely and exclusively, hand-over-hand touch conditions the hands of the child who is deafblind to be passive, to wait for direction from the hands of another, and to avoid reaching out into the world for information and stimulation.

Figure 1. The teacher's hand is slightly under the child's as they explore together.

In the majority of situations, the most skillful way of touching the child (or adult) who is deafblind is hand-under-hand. When the child's hand is exploring an object, or part of his own body, or the body of another, a gentle touch under part of the child's hand becomes the tactile equivalent of the pointing gesture. Such a touch establishes a mutual topic and lays the groundwork for language development. The precise nature of this touch is important. Hand-under-hand touching of this kind must be done carefully, with three goals in mind.

This hand-under-hand touch

- is noncontrolling.
- allows the child to know that you share the experience of touching the same object or of making the same kind of movements.
- does not obstruct the most important parts of the child's own experience of any object he may be touching.

Recent research has shown that "when infants are actively attending to an object they share with their mothers, they are most likely to produce their first words and gestures" (Adamson, Bakeman, & Smith, 1994, p. 41). The kind of touching described here—adult's hand slightly under the child's, done carefully and repeatedly—ensures that the child who is deafblind will have the opportunity to share

attention to an object (or a movement) and thus lays the foundation for her first words.

4. Make your hands available for the child to use as he or she wishes.

Before a child learns to use her own hands as reliable tools, she will often trust and use the hands of another. Most people have seen a young child reach for an adult's hand and place it upon an object that she wants manipulated. In order for a child who is deafblind to be able to do this, the hands of the adult must be available for her to use. Without sight, the availability must be experienced tactually. I have found the most effective gesture is usually to place my hands, palms up, lightly under the child's hands, with my index fingers accessible for grasping. If a child has sight that she uses, the same gesture can be made in front of her. What is communicated in such a gesture, done again and again, is, "Here are my hands. Use them how you like. Explore what they can do." The adult's hands must remain free of tension, and pliable , in order for the child to use them as tools. Often the child will accept the offer, grasp my hands, experiment with moving them. Out of this simple gesture, many games and hand conversations can develop, and the child can gain confidence in her ability to use her own hands to effect the world.

Figure 2. The teacher's hands are underneath—available for the child to use as tools.

5. Imitate the child's own hand actions, your hands under the child's.

Imitation is the best form of encouragement. It serves to bring the child's awareness to his or her own hands and reinforces for her their power as avenues of expression. This is equivalent to what mothers instinctively do when they imitate their children's sounds, movements, and facial expressions. Any time the child uses his hands actively—to bang, clap, wave, open and close, wiggle, shake, finger—these actions can be imitated, using the hand-under-hand position described above.

6. Play interactive hand games frequently.

For the child who is deafblind these games are the equivalent of babbling games with the child who is developing speech. (They should be used in addition to babbling games, rather than as a substitute for them, whenever feasible.) Games may follow from the imitation of the child's own motions, and they may be invented and gradually elaborated. Clapping, opening and closing fingers, crawling with fingers, tickling — all of these kinds of movements and others can be done in playful, turn-taking ways, giving the child maximum opportunity to feel the adult's hands.

7. Make environmental provisions to encourage hand activity, appropriate to the developmental level of the child.

Provision of toys or interesting materials at midline is particularly important for the child who needs to learn to use both hands together. Hanging toys over a crib or within a "Little Room" such as the one designed by Lilli Neilsen will allow the child to discover her own ability to coordinate both hands and will encourage confidence in this skill. If these are sound-making toys that can exploit any residual hearing, or interestingly textured toys, they will be particularly valuable. Noticing the child's grasping abilities and providing toys appropriate to those abilities is also important—a child with an ulnar-palmar grasp (fingers against palm), for example, will need different toys from those offered to a child who is developing a pincer grasp.

Once a child is interested in objects for their own sake, it is important to notice what qualities of objects interest her and to provide additional toys that have similar, but slightly different, qualities. Doing so will help expand the child's tactile experience and therefore aid in her developing hand skills and confidence. Ongoing provision of interesting tactile materials is crucial.

8. Encourage energetic throwing in appropriate settings and at appropriate developmental times.

Because confidence in hand use is of crucial importance to the development of the child who is deafblind, it is important to encourage any active hand behaviors. Throwing is both a hand behavior and a large muscle behavior. As we have seen, it also seems to be part of a sequence of development that is particularly important for the child without vision, related to the acquisition of a secure sense of object permanence and sense of self. Beanbags with pleasing textures are particularly suited to safe and satisfying throwing. A secure environment in which throwing will not endanger the child or others will ensure that caregivers can allow and encourage this behavior at appropriate times, thus helping the child to develop an active confidence in her ability to use her hands in this way.

9. Invite access to your own hands while they are engaged in a wide variety of activities.

Parents, teachers, and friends of children and adults who are deafblind can provide many rich experiences of the world by inviting the child or adult to feel hands as they cook, clean, assemble materials, wash, explore, communicate with others, and simply rest at ease. When a child or adult is comfortable with the hand-under-hand position (her hand resting on another's), the invitation to touch can be made either with language ("Would you like to touch___?") or by simply putting your hand gently under the hand of the person who is deafblind and moving it toward the activity. If your hand is under the hand of the one who is deafblind, she is free to move away, and the gesture feels like an invitation rather than a direction. Assuming a child has had many positive, nondirective experiences involving touch, she will be curious and motivated to explore your actions. Opportunities such as this, offered many, many times in the course of interactions, will educate the hands and mind of a child and will offer ongoing opportunities for an adult who is deafblind to be in touch with the actions of the world, the materials of the world, and her options for interacting with others.

Giving the person who is deafblind the opportunity to "overhear" signed conversations by touching the signs of the persons involved is important and should be provided on a regular basis. Without the invitation to touch such conversations, a person who is deafblind does not have the experience of witnessing interactions; he has the skewed experience of only knowing communication that is directed toward himself. This has obvious social implications if it constitutes the whole of a person's experience. Being in literal touch with the conversations of others will help balance experience and broaden the world of the one who is deafblind.

10. Invite the person who is deafblind to have frequent tactual access to the environment.

This may seem too obvious to state, but it is all too often forgotten. A person who is blind, but who retains acute hearing, can learn a great deal through his ears and will often ask to touch objects of interest whose existence he has inferred from conversation or sounds. A person who is deafblind has very few clues about what is available beyond the reach of his hands. He therefore must depend upon the good will of people around him to make the environment accessible. When entering a new environment, it is particularly important to orient the person who is deafblind. A child will need many, many experiences of touching objects and environments before language can serve to describe them meaningfully and before he can benefit from an interpreter's services in lieu of actual touch.

11. Model whatever hand skills you wish the child or adult to acquire and allow her tactual access to that modeling.

Too frequently, children who are blind or deafblind are first shown hand skills by putting their hands through the motions of the activity the teacher or caregiver wishes them to do. While this kind of assistance can be valuable for the child who has difficulty with manipulation, it helps the child if he can "see" you perform the actions first, before he is expected to do them and before he is manipulated through them. Modeling can happen most naturally if activities are thought of as mutual: Do things together with the child, rather than to the child. An activity like tooth-brushing, for example, can easily be modeled for the child if you make it a habit to brush your own teeth at the same time, and if you invite him to touch your toothbrush and motions as you engage in this activity.

Adult persons who are deafblind can benefit greatly from this modeling and mutuality. In a workshop, for example, staff members who perform the same tasks alongside workers who are deafblind, and who also invite the ones who cannot see to touch their hands as they work, are communicating a great deal to the person who is deafblind. They are not only modeling hand skills, but also are encouraging other work skills such as sustained attention. In addition, they are affirming a sense of belonging in the person who is deafblind, and this person becomes part of a "we" rather than feeling isolated or set apart. This sense of belonging is created through the skillful use of the hands on the part of those who work with the person who is deafblind.

12. Make language accessible to the hands of the person who is deafblind.

For many people who are deafblind, hands are the only sense organs that can reliably access language. A young child who can hear will have heard thousands and thousands of words before producing her own first word. A child who is deafblind needs to touch thousands of words before she will be able to begin to make sense of language and produce her own first words. She needs to touch these words in a way that will allow her to attach meaning to them—while she is experiencing the things for which they stand. This will mean naming objects for the child as she is touching them, naming actions as she is engaging in them, and naming feelings as she is experiencing them.

Sign language is usually the most efficient way to make language tactually accessible. In Alaska, Inuit children who are deafblind are naturally exposed to sign language because people in that culture already know a sign language which they use to communicate across distances while hunting. A family begins using signs consistently as soon as they realize that a child is deaf. Simply by virtue of having accessible sign language (made more accessible because their living spaces are very small, and therefore ensure that touch can happen easily), children who are born deafblind in this culture frequently acquire many signs by the age of four or five. (Rhonda Budde, personal communication, March, 1997). Teachers, parents, and caregivers of children who are deafblind would do well to think of creating a similar culture within the classroom and home—a culture in which a child who is deafblind can hear language with her hands (or eyes, when possible). Making language accessible to the hands or eyes is different from teaching language one sign at a time. A child or an adult learns language by virtue of consistent meaningful exposure, not by being taught one word at a time. Teaching individual words is necessary at times, but only within the context of overall exposure to accessible language.

Sign language and also Tadoma method, tactile cues, object symbols, two-dimensional symbols, and braille all can serve as ways of making language accessible to the hands of a person who cannot see or hear. Inviting a person who is deafblind to touch you as you speak, the thumb lightly on the lower lip and the fingers extended along the throat where the sounds vibrate, can allow her to make discriminations of vocal vibrations that can increase accessibility of language (this hand position is called the Tadoma position). Having activities represented by tactile cues and/or object symbols can be one of the first symbolic ways of indicating to a child what is about to happen and can serve as an early way of making language tactually accessible. Exposure to braille and/or textured labels can duplicate a sighted child's natural exposure to print—the child who is deafblind can receive exposure to simple labels long before she is expected to read them. Such exposure simply gives the child the opportunity to recognize that the tactile or braille labels exist and that those things stand for objects or persons, just as a child who can see will begin to notice labels on all kinds of things around the house and school.

13. Become aware of your own hands as carriers of feelings and pragmatic functions.

Each time we touch one another we communicate something by the quality of our touch. A person who is deafblind will likely be able to read that communication with more sensitivity than people who focus their attention primarily on what they see and hear. We need to be aware of just what we are communicating when we touch. Touch can communicate a wide variety of feelings, as my students and friends have taught me over the years. The speed with which my hands move, the lightness or heaviness of my touch, the warmth or coolness of my hands—all of these and more can convey happiness, sadness, anger, impatience, disappointment, and a whole array of other feelings. It will help our communication if we can be increasingly aware of what our hands are saying when they touch. But we will not always be able to be completely conscious or in control of what our hands are conveying. Here, our students, friends, and family members who are deafblind may be of great help to us. They can reflect for us our own feelings, helping us to become more conscious and more aware. This can only happen, however, if we are sensitive to their reactions to us, and if we invite feedback.

Hands can express not only feelings, but also intentions. They can convey pragmatic functions. A touch can be a command, a question, an exclamation, an invitation, or a simple or complex comment, depending upon its nature. Any of these pragmatic functions used to excess can inhibit conversational interaction, whether the conversation is verbal or nonverbal. Too many commands or "teacherese" questions (ones to which the questioner already knows the answer) are particularly apt to cut off an easy back-and-forth flow—one need only consult one's own conversational experiences to know that this is true. Comments, genuine questions, and invitations are more likely to encourage further interaction. As a result, when interacting with a person who is deafblind—including persons who have no sure command of language—we need to learn to touch in ways that convey these intentions. A physical therapist, for example, might find it useful to think in terms of inviting a child to perform a particular movement rather than commanding her to do so. Pausing during the interaction to comment with touch on whatever the child is interested in will also be likely to facilitate any interaction. A comment can take the simple form of the hand-under-hand touch described in #3 above, or it can be a nondirective touch that conveys sympathy. It can even be an imitation of a gesture, which simply says, "I hear what you are saying," in much the same way that eye contact or a nod of the head would convey that to someone who could see. The most important feature of a comment—as distinct from a command, a directive, or some kinds of questions—is that it contains no trace of demand. It leaves the other free to respond or not respond.

Learning to comment with our hands while interacting with persons who are deafblind will frequently require resisting the temptation to always direct and do things for and to the other person. This temptation is often, at least in my own experience, born of the natural desire to help a person who seems to need a lot of help because of their sensory deficits. Resisting it may require that I begin to trust and respect the natural competence of the person who is deafblind, in whatever form that competence takes. I need to begin to realize that she will discover things for herself if I do not always direct her hands, and that she will come up with observations and ideas of her own if I do not only ask her directive questions. In order for this to happen, I need to allow her hands the freedom and time to express themselves. I also need to learn to use my own hands not only as tools (their typical function), but also as sense organs, and as a kind of voice that can convey highly differentiated feelings.

An adult woman who is deafblind described an experience in which a careful touch served to convey feeling and empathy and was a simple, soothing comment:

I remember when I had surgery in the hospital, I was just waking from the anesthesia. I was not fully alert yet and started to feel "alone" because my hearing aid and glasses were off and I was cut off from sounds and things. Suddenly, I felt a hand caressing my arm, telling me everything is o.k. and all is well. That hand meant the world to me! It conveyed more than sight and sounds would have at that moment. (Dorothy Walt, personal communication, April, 1997)

Another young woman who is deafblind expressed the importance of hands in her life with the following poem:

My Hands My hands are...

My Ears, My Eyes, My Voice...

My Heart.

They express my desires, my needs

They are the light that guides me through the darkness

They are free now No longer bound to a hearing-sighted world

They are free

They gently guide me

With my hands I sing

Sing loud enough for the deaf to hear

Sing bright enough for the blind to see

They are my freedom from a dark silent world

They are my window to life

Through them I can truly see and hear I can experience the sun against the blue sky

The joy of music and laughter

The softness of a gentle rain

The roughness of a dog's tongue

They are my key to the world

My Ears, My Eyes, My Voice... My Heart

They are me

Amanda Stine, 1997

We all have much to learn about hands, and about touch as a way of knowing. Touch is a neglected sense in our culture, and hands are too often ignored as avenues of expression. People who are deafblind can be our teachers as we all learn how to use our hands more and more skillfully.

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Afterward

It is well-known that evolution endows species with the ability to adapt to a changing environment over time. Less appreciated perhaps is the fact that evolution has also endowed us with the ability to adapt to our environment during our lifetimes. The ability of the human brain to adapt to changes in the environment, called cortical plasticity, is nothing short of astounding.

Cortical plasticity involves much more than merely reinforcing brain areas that receive stimulation and shutting down brain areas that no longer receive stimulation from inoperative senses; it also involves, when some senses are depleted, compensatory changes in the nervous tissue serving other, remaining senses. The brain may sprout new connections in the tissue serving remaining senses, and it may also reallocate to those remaining senses brain areas that otherwise would have served the inoperative senses. Thus is created the neural basis for enhanced performance with the remaining senses, an adaptation favoring survival of the organism with the altered sensory configuration. As a result, one can learn language with vision alone, one can learn object classes and object constancy using touch, learn to anticipate using smell, learn causality using only audition, and so on. Likewise, social-emotional skills— getting attention, cooperating, persuasion, bonding, play—can be learned and executed with various senses. The deaf learn to do all these things without sound, the blind without vision. For success, the crucial problem that must be solved is this: How must the presentation of events be reorganized to match the sensory modalities available.

To gain a sense of the subtlety and complexity involved in designing modality appropriate stimulation, we need only consider one of the natural human languages that has evolved appropriate for visual people, the American Sign Language of the Deaf, and take note of the many ways in which it is adapted to and appropriate for vision— in its rules for sign formation; in its use of space for grammar; in its use of several concurrent "channels" of information and much more. Deaf children exposed only to signing without a spatial grammar end up introducing spatial grammar into their signed utterances even though they have never seen it.

If children who grow up deaf are visual people, children who grow up deafblind are tactual people. Their modality appropriate stimulation must come, above all, through the skin, especially through those sensory receptors that can reach out into the space around the deafblind person - the hands. Deafblind adults can teach us much about how to channel information through the tactile sense, for they make such adaptations every day. The challenge, then, for the families and teachers of deafblind people is to find ways to reorganize our daily interactions that are attuned to vision and hearing so that they become attuned instead to touch. Braille did just that when he invented his code of the alphabet; the deafblind community did just that when it adapted communication in ASL to the tactual modality. However,

nothing less than all types of human interactions must be rethought in this way. This takes deep familiarity with deafblind people, a readiness to be their student as well as their teacher, commitment and creativity. Barbara Miles reveals all of these in the preceding reflection on how to talk the language of the hands to the hands.

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